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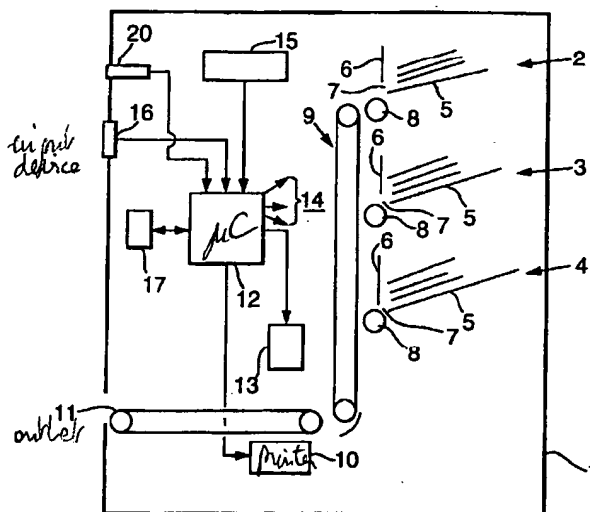
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(54) Title: DOCUMENT OF VALUE DISPENSER AND METHOD



(57) Abstract: A document of value dispenser comprises at least one store (2-4) for storing base stock; a printer (10); one or more outlets (11); and an input device (16). A transport system (9) feeds base stock from the or each store (2-4) via the printer (10) to the outlet(s) (11). A controller (12) is responsive to payment information received via the input device (16) relating to the purchase of a document of value to cause the transport system (9) to feed a sheet of base stock corresponding to the purchased document of value to the printer (10), to cause the printer (10) to print a security pattern on the document of value, and to cause the transport system (9) to dispense the printed document of value via the or one of the outlets. A system (17) for communications with a remote source so as to obtain data relating to the security pattern to be printed.

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DOCUMENT OF VALUE DISPENSER AND METHOD

The invention relates to a document of value dispenser and a method of operating such a dispenser.

5 It is already known in the fields of airline ticket dispensing and theatre ticket dispensing to arrange for purchasers to collect their tickets near to the point of use. This is achieved by obtaining pre-payment from the purchaser via a credit card or the like, and then providing  
10 a dispenser which holds a stock of blank tickets (i.e. rolls or cassettes of tickets preprinted with standard patterns relating to the issuing organisation, but without personalized indicia). The purchaser enters a code number, such as his credit card number, into the dispenser which  
15 can then check on a database the details of the transaction and obtain information such as a receipt number and the like. The dispenser then prints that personalized information onto the ticket stock, which is then dispensed.

US-A-5243174 illustrates an electronic gift  
20 certificate dispenser in which a set of preprinted gift certificates are located in the dispenser. A user can purchase a certificate by entering credit card details or the like which are transmitted to a remote computer for validation and, if the validation is confirmed, the  
25 certificate is issued having been printed with retailer information and the like which is stored in the dispenser.

US-A-5909637 is concerned with a system for printing forms at remote sites under the control of a central server. The central server supplies a general coupon  
30 template which is downloaded to the remote processing station which combines that template with site specific information and prints the coupon.

There is a need to be able to extend this type of ticket or voucher handling, which at the moment has very  
35 limited use, usually within a single field or purpose, for example airlines and theatres. One of the reasons for this is that each operator traditionally has their own specific

requirements for the security features which are to be incorporated into the vouchers or tickets and only needs dispensers in restricted locations.

In accordance with a first aspect of the present invention, a document of value dispenser comprises at least one store for storing base stock;

a printer;

one or more outlets;

an input device;

10 a transport system for feeding base stock from the or each store via the printer to the outlet(s);

a controller responsive to payment information received via the input device relating to the purchase of a document of value to cause the transport system to feed  
15 a sheet of base stock corresponding to the purchased document of value to the printer, to cause the printer to print a security pattern on the document of value, and to cause the transport system to dispense the printed document of value via the or one of the outlets; and

20 a system for communicating with a remote source, so as to obtain data relating to the security pattern to be printed.

The new document of value dispenser introduces significant flexibility to existing dispensers by allowing  
25 the use of base stock which has not been preprinted with security patterns to be used. This means that it is not necessary to maintain a store of base stock in the dispenser which has already been provided with security patterns and thus the risk of fraud following illegal  
30 removal of such base stock is avoided. Furthermore, the invention enables the same base stock to be used for printing different value documents, allowing different levels of security to be achieved by the use of the different security patterns in accordance with the value of the  
35 document. A further advantage is that the operator of a system including the dispenser can vary the security

patterns very easily since this can be done centrally at the remote source.

Examples of security patterns, which can later be used to authenticate the source of the document and the like, include complex line patterns, printed latent images, guilloches, microtext, rainbow patterns and medallions. The choice depends on the level of security required.

Preferably, the printer is further adapted to print designs such as indicia relating to the issuing organisation or type of document to be dispensed. These designs may also be downloaded from the remote source. This allows blank base stock to be used in the dispenser, further reducing the need to secure that base stock.

Typically, at least the security patterns will only be downloaded when the remote source and/or the local controller has confirmed that the transaction is completed (i.e. that a funds transfer has successfully taken place) or a potential guaranteed funds transfer has occurred.

The invention also has the advantage that it allows multiple issuers to use the same dispenser since security patterns (and designs) relating to a particular issuer or document are not preprinted on the base stock and can therefore be downloaded as appropriate. Thus, multiple issuers can share a network of dispensers rather than having to use single purpose machines as at present. The issuers do not need to enter into any arrangements with other issuers or even be in the same industry. By accepting the security of the base stock, and the process of downloading at issuance, any issuer using any means of prebooking/payment can distribute his documents of value via the network of dispensers.

Furthermore, an issuer can redesign and update its security patterns centrally, for example to change security levels, issue tickets for multiple events and delete old events without having to retrieve and replace previous base stocks supplied to the dispensers. The issuer can also

avoid postal, distribution, administration and other logistical costs of issuance.

Various forms of payment can be utilized. For example, the input device could incorporate one or both of  
5 a currency receiving and reading device and a magnetic or IC card reader. This enables a purchaser to purchase a document of value immediately at the dispenser. In that event, the controller will, in response to the provision of  
10 currency, authenticate the currency supplied in a conventional manner and then communicate to the remote source that a document of value is to be printed, the remote source supplying the appropriate pattern or design.

If a magnetic or IC card is supplied then this can again be authenticated in a conventional manner via the  
15 communicating means, the controller accessing the card issuing organisation for authority.

In a further alternative, the document of value may have been pre-purchased and the user simply inputs a code or other form of identification via the input device. The  
20 controller authenticates that code, typically by communicating with the remote source, and then receives the required pattern for printing.

In some cases, a single base stock store may be provided. This would be acceptable if a single issuer of  
25 documents of value is involved or if multiple issuers are happy to use the same base stock. However, more than one store may be provided to allow different types of base stock to be made available if required by issuers. These different types of base stock typically incorporate  
30 different levels of security appropriate to different issuers or different values to be allocated to the documents. Examples of security features which could be used include threads, water marks, holograms, kinegrams, magnetic ink, fluorescent and phosphorescent features and  
35 even unique digital patterns which can be later checked against an issuing database via the Internet.

For example, the dispenser could be operated to dispense high value vouchers for one or more issuing organisations, in which the base stock is provided with several security features, such as water marks, threads and the like, while one or more other stores are used for dispensing lower value tokens and thus uses base stock with relatively few security features. Of course, further types of base stock may be available if the dispenser includes more than two stores.

Because the resulting documents of value such as tickets, vouchers, tokens and the like have consistent inherent physical and digital security/authenticity features, the issuer will be able to use a number of means for checking the documents at the point of redemption. The security level used can be varied even after the documents have been issued by choosing to look for more security features than in a normal situation.

In addition to obtaining security pattern information from the remote source, the dispenser may also obtain a unique identifier such as an encrypted code which is then printed on the document of value. Alternatively, the base stock could be preprinted or otherwise provided with unique identifiers.

The system for communicating with the remote source may comprise a modem so that communication is achieved over a private or public telephone network or alternatively an interface to enable communication to be achieved over a network such as the Internet. In these cases, the data defining the security patterns will typically be encrypted to ensure that it is securely transferred, using any conventional encryption technique such as a public key process.

In accordance with a second aspect of the present invention, a method of operating a document of value dispenser according to the first aspect of the present invention comprises loading the or each store with base stock, and

causing the controller to respond to payment information received via the input device relating to the purchase of a document of value to cause the transport system to feed a sheet of base stock corresponding to the purchased document of value to the printer, to cause the printer to print on the document of value a security pattern received from the remote source, and to cause the transport system to dispense the printed document of value via the or one of the outlets.

5 The security patterns define one or more security features such as complex line structures, bar codes, digital watermark encoding and the like.

In addition to the security patterns, the printer (or an auxiliary printer) may also print personalised information such as a seat number, purchaser's name, account number or the like, and other designs relating to the document of value such as the name of the issuing organisation and decorative graphics.

15 In the preferred construction, a single outlet is provided to which all printed documents of value are dispensed. However, more than one outlet may be used, for example for documents of value dispensed from different stores.

An example of a document of value dispenser, a method of operating a dispenser, and a system in accordance with the present invention will now be described with reference to the accompanying drawings, in which:-

Figure 1 is a schematic diagram of the primary components of the dispenser; and,

30 Figure 2 is a schematic block diagram of a dispensing system.

The dispenser shown in Figure 1 comprises a secure cabinet 1 in which are mounted three stores 2-4, each comprising a base plate 5, a front wall 6 which defines a gap 7 with the base plate 5, and a feed roller 8.

35 Rotation of one of the feed rollers 8 in an anti-clockwise direction will withdraw the lowermost sheet of



base stock, typically paper, from the appropriate store 2-4 in a conventional manner, and feed it to a belt transport system 9, which is schematically shown.

The transport system 9 conveys the sheet to a printer 10, such as an inkjet printer, where certain security patterns, designs and other indicia are printed on the document which is then transported on to a dispense outlet 11.

The dispenser is controlled by a microprocessor 12, which in turn controls a drive motor 13 coupled via suitable clutches to the rollers 8 and the transport system 9. The clutches are controlled via communication connections 14. In addition, a key pad 16 and a card reader 20 accessible to a user are mounted in a wall of the cabinet 1 which is connected to the microprocessor 12.

Figure 2 illustrates three dispensers 30-32 each constructed similar to that shown in Figure 1, connected to the Internet 33. Two remote sources 34,35 are also connected to the Internet 33. Each source 34 comprises a microprocessor 36, a store 37, and an interface 38. Typically, each source 34,35 will be owned and managed by a separate retailer. Each store 37 will store digital data defining security patterns appropriate to documents of value to be issued for that retailer as well as other designs such as logos, document graphics and the like.

Digital data defining the security patterns to be printed by the printer 10 are downloaded from the appropriate remote source 34,35 and then stored in a store 15 coupled with the microprocessor 12.

In use, the stores 2-4 of each dispenser 30-32 are initially loaded with base stock sheets of different types. The differences between the sheets will lie primarily in their security features, such as watermarks, threads and the like.

In one example, when a purchaser wishes to purchase a ticket from a first issuing organisation 34, or a voucher from a second issuing organisation 35, he will make that

purchase typically over the telephone or the Internet using his credit card, debit card and the result of the transaction will be stored in the appropriate store 37. In order to collect his ticket or voucher, the user locates one of the dispensers 30-32 and enters information identifying his pre-purchase, such as his credit or debit card number or a booking reference or confirmation via the keypad 16 or the card reader 20. The microprocessor 12 passes the received information back via the modem 17 and Internet 33 to the appropriate remote source 34,35 where the processor 36 checks it against authentic purchases. If the purchase is authentic, then the processor 36 will send a confirmatory signal to the microprocessor 12 together with details relating to the purchase such as receipt number or the like and data defining a security pattern to be printed on the voucher (accessed from the store 37), including a security feature such as a complex line pattern. This data will be encrypted. The pattern will typically be unique to the issuer. In addition, the processor 36 may transmit personalized information such as a ticket number, seat number and the like and also a unique encrypted code, and graphics data. The unique code will be stored in a master checking system for use when the ticket is redeemed. The data, after decryption, is then temporarily stored in the store 15 by the microprocessor 12.

Following receipt of the confirmatory signal, the microprocessor 12 will determine which of the base stock sheets is appropriate, and cause the corresponding feed roller 8 to be activated via the respective clutch. A sheet of the base stock will then be dispensed or withdrawn from the appropriate hopper, that sheet of base stock having security features required by the corresponding issuing organisation. The base stock is then fed by the transport system 9 to the printer 10, and the microprocessor 12 downloads from the store 15 to the printer 10 the appropriate security pattern and other

information described above corresponding to the ticket to be dispensed. Once this information has been printed on the base stock it is dispensed through the dispenser 11.

5 In a modification not shown, the store 15 could be omitted and the security pattern data passed directly from the modem 17 to the printer 10. This will be possible particularly if the data is not encrypted.

10 In another example, the ticket can be purchased locally. The user enters details on the key pad 16 relating to the type of ticket he wishes to purchase and the microprocessor 12 then accesses via the modem 17 the appropriate issuer database. This access could be via a direct telephone connection or via the Internet or EPTPOS network. Furthermore, if a display (not shown) is  
15 provided, this can be used to allow the user to see what tickets are available from that particular issuer and thus enable him to choose a particular ticket type, seat number, etc.

20 The user then inserts his debit or credit card into the card reader 20 and the appropriate details are transferred by the microprocessor 12 and the modem 17 to the issuing organisation which can then affect an appropriate funds transfer. On completion of that transfer, a confirmation signal is supplied to the  
25 microprocessor 12 which may be in the form of a separate signal or simply the downloading of security pattern data and the process then continues as described above in connection with the first example.

30 If the dispenser includes a currency accepting device (either coins or bills) then this device will detect or count and authenticate the supplied currency and notify the microprocessor 12 of the value of the supplied currency. The microprocessor 12 can then notify the issuing organisation via the modem 17 as to the value received and  
35 if this is sufficient to purchase the required ticket then the appropriate information will be supplied from the remote source as in the first example.

In a further modification, a scanner could be incorporated into the dispenser while the base stock incorporates scannable data such as serial numbers. The scanner scans the serial numbers on the base stock within the dispenser so as to verify the data, time, place and transaction of issuance in the case of a later dispute.

At the point of use or redemption (for example entry to an event, exchange for goods or services and the like), the person receiving the ticket is able to use various means to authenticate it. These include visual, machine and on-line methods depending upon the features present on the ticket. If a unique encryption code has been printed then this can also be checked. If there is a clash or conflict (e.g. two tickets for the same seat), the redeemer can increase the level of checking from visual to machine sensed features, to, as the ultimate, online verification of digital codes. Thus a variety of features are provided in the downloaded pattern and base stock which can be interrogated in successively more detailed ways for verification.

Alternatively, if one level of interrogation fails, e.g. a machine interrogation, a ticket can be visually verified using another security feature.

In preferred examples, a remote monitoring system (not shown) is provided which can communicate with the dispenser via the modem 17 to check that the machine's functionality remains intact. Given that the dispenser may be a stand alone device, it is important that it remains functional and that this can be checked.

Conveniently, the microprocessor 12 stores a transaction log which is accessible from both the ticket issuer and the equipment manufacturer.

For added security, the microprocessor 12 may be adapted regularly to remove patterns from the store 15, for example on a daily basis or more regularly such as immediately following printing of the patterns. This

reduces the risk of fraudsters obtaining the patterns and also ensures that only up-to-date designs are used.

CLAIMS

1. A document of value dispenser comprising at least one store for storing base stock;  
5 a printer;  
one or more outlets;  
an input device;  
a transport system for feeding base stock from the or each store via the printer to the outlet(s);  
10 a controller responsive to payment information received via the input device relating to the purchase of a document of value to cause the transport system to feed a sheet of base stock corresponding to the purchased document of value to the printer, to cause the printer to  
15 print a security pattern on the document of value, and to cause the transport system to dispense the printed document of value via the or one of the outlets; and  
a system for communicating with a remote source, so as to obtain data relating to the security pattern to be  
20 printed.
2. A dispenser according to claim 1, wherein the input device includes a currency receiving and reading device.
3. A dispenser according to claim 1 or claim 2, wherein the input device includes a magnetic or IC card reader.
- 25 4. A dispenser according to claim 3, wherein the communicating system enables the controller to arrange a funds transfer based on information obtained from the card reader and the cost of the document of value.
5. A dispenser according to any of the preceding claims,  
30 wherein the communicating system enables a user to communicate with a remote host to purchase the document of value.
6. A dispenser according to any of the preceding claims, wherein the printer is one of an inkjet printer, dot-matrix  
35 printer, bubble-jet printer, dye diffusion, sublimation or thermal transfer printer.

7. A dispenser according to any of the preceding claims, wherein a single, common outlet is provided.
8. A dispenser according to any of the preceding claims, wherein the pattern comprises one or more of a complex line  
5 pattern, printed latent image, guilloche, microtext, rainbow pattern and medallion.
9. A dispenser according to any of the preceding claims, comprising at least two base stock stores.
10. A dispenser according to any of the preceding claims, further comprising a store for temporarily storing data  
10 downloaded from the remote source.
11. A document of value dispensing system comprising one or more dispensers according to any of the preceding claims; and a remote source to which the or each dispenser  
15 is connected, the remote source including a processor and a store for storing data defining patterns to be downloaded.
12. A system according to claim 11, wherein the remote source includes an interface for communicating with the or  
20 each dispenser via the Internet.
13. A method of operating a document of value dispenser according to any of claims 1 to 10, the method comprising loading the or each store with base stock; and  
causing the controller to respond to payment  
25 information received via the input device relating to the purchase of a document of value to cause the transport system to feed a sheet of base stock corresponding to the purchased document of value to the printer, to cause the printer to print on the document of value a security  
30 pattern received from the remote source, and to cause the transport system to dispense the printed document of value via the or one of the outlets.
14. A method according to claim 13, wherein at least two types of base stock having different security features are  
35 loaded in respective stores.
15. A method according to claim 14, wherein the security features are chosen from the group comprising threads,

water marks, holograms, kinegrams, magnetic ink, fluorescent and phosphorescent features and unique digital patterns.

5 16. A method according to any of claim 13 to 15, further comprising causing the printer to print a design on the base stock defining the document of value.

17. A method according to claim 16, wherein the designs define one or more of vouchers, tickets, travellers cheques, gift tokens, entry passes, and gaming receipts.

10 18. A method according to claim 16 or claim 17, wherein the designs correspond to different issuing organisations.

19. A method according to any of claims 13 to 17, wherein the pattern comprises one or more of a complex line pattern, printed latent image, guilloche, microtext,  
15 rainbow pattern and medallion.

20. A method according to any of claims 13 to 19, wherein a unique identifier is preprinted on the base stock.

21. A method according to any of claims 13 to 19, further comprising printing a unique identifier on the document of  
20 value.

22. A method according to any of claims 13 to 21, wherein the security pattern is temporarily stored by the dispenser until the document of value has been printed.



Fig.1.

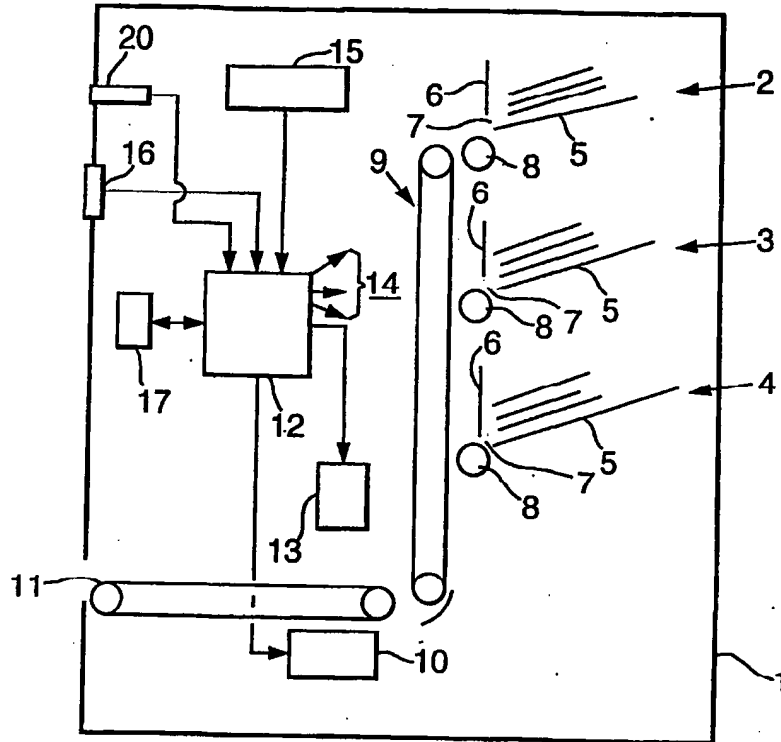
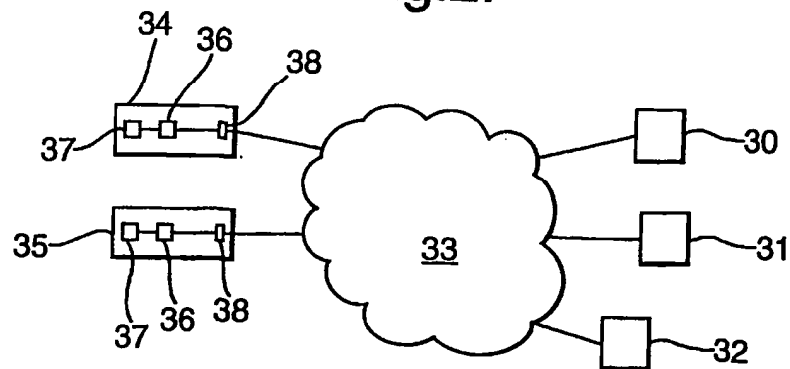


Fig.2.



# INTERNATIONAL SEARCH REPORT

International Application No  
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
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Form PCT/ISA/210 (continuation of second sheet) (July 1982)

# INTERNATIONAL SEARCH REPORT

Inter- national Application No  
PC 1, 0B 01/04347

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 G07F17/42		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 G07F G07B		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the International search (name of data base and, where practical, search terms used) EPO-Internal		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y	the whole document	2-7, 9, 11-22
Y	US 4 449 186 A (KELLY GUY M ET AL) 15 May 1984 (1984-05-15) abstract; figures	2-7, 9, 11-22
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-/-		
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Date of the actual completion of the international search 10 January 2002		Date of mailing of the international search report 17/01/2002
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